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PATENT SPECIFICATION

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DRAWINGS ATTACHED

1 319 928

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(72) Inventor A. SCHAERLI

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(54) DOCUMENTS INCLUDING MEANS CARRYING INFORMATION TO PROVE THE GENUINENESS OF THE DOCUMENT

(71) We, LANDIS & GYR AG, a body corporate organized and existing under the laws of Switzerland, CH-6301 Zug, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to documents including means carrying information to prove the genuineness of the document, and to methods of making such documents. Such documents may, for example, be bank-notes, travel tickets, credit cards or identity cards.

There are bank-notes in circulation in which a strip of plastics film has been inserted in the paper skin. The film, which is clearly visible and can also easily be felt, provides a simple and rapid means of testing the genuineness of the bank-note; the film can only be worked into the paper skin by an expensive process which a forger of bank-notes would have difficulty in mastering.

It has already been proposed to provide a document, such as a bank-note, with a metal coated plastics film of a structure such that it can be detected electrically to check the genuineness of the note.

Credit cards with a magnetic information carrier are known, where the information carrier contains *inter alia* information to prove the genuineness of the card. The disadvantage is that such magnetic carriers are relatively easy to forge.

According to the present invention there is provided a document including a film carrying information to prove the genuineness of the document, the information being in the form of microscopic apertures (as hereinafter defined) extending through the film.

The word "apertures" here refers to apertures which do not extend to the edge of the film, and are of any geometric shape. They may, for example, be circular, square or oblong with straight or curved sides. The term "microscopic" indicates that the diameter or width of the apertures is minute; a diameter or width such that the aperture is still just perceptible when looked through by the naked eye should here be regarded as the upper limit.

The invention will now be further described by way of example with reference to the accompanying drawing, in which:

Figure 1 is a section through a document and

Figure 2 is a plan view of a film.

Referring to Figure 1, this shows a paper document 1 such as a bank-note, a travel ticket, a credit card, an identity card or the like. A film 2 is embedded in the paper skin of the document 1. In order that the film 2 will adhere well to the paper material and will not increase the volume or thickness thereof, it is preferably in the form of a strip and has a maximum width of 3 mm and a maximum thickness of 0.05 mm. The other reference numerals used in Figure 1 will be explained in connection with Figure 2.

Figure 2 shows part of the strip of film 2 in plan. Information is fed into the film 2 in the form of microscopic apertures 3, 4 and 5 extending right through it. The apertures 3 and 5, arranged in one or more rows, constitute information in code form, and the apertures 4 form letters or figures. Additional apertures 6, aligned and at equal intervals, enable a reading head to be correctly positioned over the document 1 when the information is being read.

The apertures 3 to 6 can be economically formed with the aid of laser or electron beams. The use of laser or electron beams enables holes of almost any desired degree of fineness to be produced in the film 2.

When the genuineness of the documents

is being tested, the information carried in the film 2 is sensed, read and processed with the aid of light or corpuscular rays (for example β-rays). Any specimens which do not contain information to prove the genuineness of the document are eliminated as forgeries. Nor will the specimens pass the test of genuineness if the diameter d or the width b (Figure 2) of the apertures 3 to 5 exceeds a given value. The nature of the film material may also provide a criterion for testing.

The smaller the diameter d or the width b of the apertures, the more difficult does forgery become. If a nominal value of 0.02 mm is taken as the maximum, procedures which are easily accessible to a forger, such as punching holes, spark erosion, pricking and the like, will become impossible for technical reasons or will prove unprofitable with a given density of information.

The film material is chosen according to the degree of security required. In the case of tickets, for example, which are hardly worth forging, it will usually be sufficient to make the film 2 of a plastics material which is coloured so as to give low transmissivity to the test rays. Although forgery by photo-mechanical or chemical methods is possibly just conceivable, it would be very difficult to carry out because of the exteremely small dimensions of the apertures. Moreover, photo-mechanical methods without any etching process may be rendered difficult by using a metal coated plastics film.

Chemical methods of producing apertures of the given dimensions may be excluded by using a metal foil which is difficult to attack chemically, for example tantalum. A foil of chemically unresistant metal may equally be used if the diameter d or the width b of the apertures is small relative to the thickness of the foil. In the latter case a forgery with apertures produced by etching, which would naturally have a conical shape, would easily be recognised when testing the size of the apertures. For this purpose the foil would be irradiated with parallel light, so that a larger luminous flux would emerge from a conical aperture than from a cylindrical aperture.

Preferred foil materials are silver or copper; because when the genuineness of the document 1 is being checked these enable the material to be tested easily by measuring its electrical conductivity.

The information fed into the film in the form of apertures may, for example, indicate the class or series of the document in question. In this case the apertures are preferably formed before the film and the document are brought together.

The apertures may equally be formed in the document already combined with the film. This is an advantage particularly in cases where individual data, such as the number of the document in question, has to be stored on the film. Apertures 5 of this type are shown in Figure 2. They extend not only through the film 2 but also through the paper material surrounding it.

When bank-notes and the like are printed, variations in the printing and colour properties are inevitable. Where documents are printed on both sides there are also misalignments between the two impressions. By virtue of this fact, given individual colours or other characteristics of the document such as the amount of misalignment between the two impressions may be measured exactly, for example by measuring the transmissivity or reflectivity, and the resultant measurements can be stored on the film 2 in coded form. The film 2 may also store data indicating the locations on the document where the individual dimensions were measured. The measurement may be taken, for example, a predetermined distance along one side of the film 2. This distance may be selected individually for each document and fed into the film 2 in coded form.

When testing the genuineness of such documents, the same individual dimensions are measured on the specimen and the measurements are compared with the values stored on the film 2. In this way a forgery where the printing and the film 2 would of themselves be found to be genuine, would nevertheless be recognised as counterfeit.

WHAT WE CLAIM IS:—

1. A document including a film carrying information to prove the genuineness of the document, the information being in the form of microscopic apertures (as hereinbefore defined) extending through the film.

2. A document according to claim 1 wherein the film is made of metal.

3. A document according to claim 1 wherein the film is made of metal coated plastics material.

4. A document according to claim 2 or claim 3 wherein the apertures have a maximum diameter or width of 0.02 mm.

5. A document according to claim 2 wherein the metal film is made of a metal which is resistant to chemical attack, and the diameter or the width of the apertures is less than the diameter or width of the smallest aperture which can be etched in said metal by chemical methods.

6. A document according to claim 2 or claim 5 wherein the diameter or width of the apertures is small relative to the thickness of the metal film.

7. A document according to claim 6 wherein the metal film is made of silver or

copper.

8. A document according to to any one of the preceding claims wherein the film has a maximum thickness of 0.05 mm.

9. A document according to any one of the preceding claims wherein the film is in the form of a strip and has a maximum width of 3 mm.

10. A document according to any one of the preceding claims wherein some at least of the apertures form letters or figures.

11. A document according to any one of the preceding claims wherein some at least of the apertures constitute information in coded form.

12. A document according to any one of the preceding claims wherein the film contains additional apertures which enable a reading head to be correctly positioned over the document when the information is being read.

13. A document according to claim 12 wherein the additional apertures are aligned at equal intervals.

14. A document according to any one of the preceding claims wherein data relating to characteristics of the individual document are stored in the film.

15. A document according to claim 9 wherein the document is a paper document, and the strip of film is embedded in the skin of the paper.

16. A document, according to any one of the preceding claims, in the form of a bank-note.

17. A document, according to any one of claims 1 to 15, in the form of a travel ticket, credit card or identity card.

18. A method of making documents according to any one of the preceding claims wherein apertures in the film are produced with the aid of a laser or an electron beam.

19. A method according to claim 18 wherein the apertures are produced before the film is combined with the document.

20. A method according to claim 18 wherein given individual characteristics of the document are measured, and these measurements are stored on the film.

21. A method according to claim 20 wherein colour and/or printing characteristics of the document are measured, and these measurements are stored on the film.

22. A method according to claim 20 or claim 21, wherein data indicating the locations on the documents where the individual characteristics have been measured is stored on the film.

23. A method according to claim 20 wherein the measurements are stored on the film after the film has been combined with the document.

24. A document substantially as hereinbefore described with reference to the accompanying drawing.

25. A method of making a document, the method being substantially as hereinbefore described with reference to the accompanying drawing.

For the Applicants:

D. YOUNG & CO.,

Chartered Patent Agents.

9 & 10 Staple Inn,
London WC1V 7RD.

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1 SHEET

COMPLETE SPECIFICATION

Fig. 1

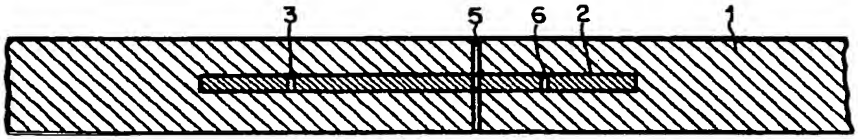

Fig. 2